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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MENON, KRISHNAN S

ART UNIT

PAPER NUMBER

1723

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/021,498	Applicant(s) AIMAR ET AL.	
	Examiner Krishnan S Menon	Art Unit 1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 5-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 5-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 1,2 and 5-8 are pending

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1,2,5 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over H. Ohya et al (XP-001023196: "Proposal of an integrated system for the complete usage of sea water", NIPPON KAISUI GAKKAISHI, vol 49, no. 4, 1995 pages 195-201) in view of Conger (US 4,141,825)

Claim 1: Ohya (XP-196) teaches a process for depleting monovalent cations from water by subjecting to RO, and then subjecting the RO retentate to electrodialysis, and recovering water depleted in monovalent cations (see fig 1.). The recovery of the divalent cations is more than 65% (by material balance from the concentrations and flow rates to the ED unit given in Fig 1) and yield of water depleted in monovalent cations is about 100% overall (see fig 1). Re the limitation "standard pressure": fig 2 of the reference shows an operating pressure of 5 MPa, which is within the range of what applicant considers as std pressure (page 2 last paragraph of specification). Re the limitation "recovering from the electrodialysis": Fig 1 of the ref shows recovering water depleted in both mono and multi-valent ions from the ED unit.

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Ohya does not teach the feed as water with ion concentration less than 3g/L. Conger (825) teaches the concentrations of feed (slightly brackish) waters below 3g/L (col 3 lines 1-10). It would also be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Conger in the teaching of Ohya because Conger teaches desalination of different kinds of waters, thereby widening the scope of the application of the Ohya process (see Conger col 1 lines 15-23, col 2 line 49- col 3 line 10, and col 4 lines 3-14).

Claim 2: Ohya teaches all the limitations of claim 1, except directly adding the water depleted in monovalent cations to the permeate from the RO. Conger (825) teaches mixing RO permeate water and electrodialysis product water (col 4 lines 3-14). It would be obvious to one of ordinary skill in the art at the time of invention to add the water depleted in monovalent cations from the electrodialyser to the permeate of the RO in the teaching of Ohya (XP-196) similar to the teaching of Conger (825) for making potable water low in sodium.

Claim 5: sodium content of water less than 150 mg/L: Ohya in view of Conger does not specifically teach the sodium content as less than 150 ppm. However, it would be obvious to one of ordinary skill in the art at the time of invention that this is only a property of the feed water being processed, and the total ion content in brackish water according to Conger is as low as 500 ppm, of which sodium is only a component, and therefore, such water would inherently encompass sodium levels below 150 ppm. Also, the process of Ohya in view of Conger is for depleting the water of ions like sodium, and therefore, it would be obvious to one of ordinary skill in the art at the time of invention

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that starting with waters of lower ion content would in no way hurt the process, it would only help the process.

Claims 7 and 8: reverse osmosis pressure less than 10 or less than 5 MPa: Fig 2 of Ohya teaches operating pressure and osmotic pressure vs recovery, wherein the operating pressure of up to 5 MPa is shown. The figure also shows the operating pressure in relation to osmotic pressure, and if the feed water salt content is lower, the osmotic pressure, which is proportional to salt concentration (Osmotic pressure, $\pi = nRT/V$, and n/V is salt concentration), also would be lower. It would be obvious to one of ordinary skill in the art at the time of invention, therefore, that a lower pressure would be adequate for a lower osmotic pressure and this can be less than 5 MPa, depending on the osmotic pressure of the feed solution.

2. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over H. Ohya et al (XP-001023196: "Proposal of an integrated system for the complete usage of sea water", NIPPON KAISUI GAKKAISHI, vol 49, no. 4, 1995 pages 195-201) in view of Conger (US 4,141,825) as in claim 1 above and further in view of Abe et al (US 6,187,201 B1).

Instant claims add the further limitations of sodium ion content of the depleted water at less than 20 mg/L, and operating pressures at less than 10 or 5 MPa. Abe teaches the sodium content in the water depleted in monovalent cations is less than 20 mg/L (table I) as in instant claim 6, and the pressure for the RO is less than 10 MPa or 5 MPa (col 3 lines 44-47) as in instant claim 7 and 8. It would be obvious to one of

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ordinary skill in the art at the time of invention to use the teaching of Abe in the teaching of Ohya in view of Conger to obtain ultra pure water as taught by Abe (see col 1 lines 5-22) because Abe uses special types of membranes not taught by Ohya in view of Conger.

Response to Arguments

Applicant's arguments filed 6/10/04 have been fully considered but they are not persuasive.

Arguments re the rejection of Abe in view of Conger is moot – new grounds of rejection.

Arguments re Ohya ref: [Applicants address the Examiner as “she” in applicants’ response. Please note that “Krishnan” is a masculine name of East Indian origin]. In response to the argument that Ohya teaches only 80% recovery, and less than 70% recovery when the pressure is less than 10 MPa, examiner wishes to point out that the applicants have mistaken in their analysis of figures 1 and 2 of the reference. Ohya teaches complete recovery of water in the text and in fig 1 as pointed out in the rejection. 86% of the Water is recovered at the HPRO station, and the rest from evaporator, adsorption station, etc. The recovery in Fig 2 deals with only the recovery of permeate water from the RO system, and it is a well known fact that the RO system does not recover 100% of the water from the feed. This is a practical impossibility because the osmotic pressure required to be overcome would be enormously high. Applicants’ claim, if claiming 100% recovery, would be non-enabling, but a 102 first

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paragraph rejection was not given only because the claim reads "about 100%", and the examiner assumes that this means only what is practically possible as approaching 100%.

In response to applicants' argument that Ohya only concerns with recovering water from salt water, which has a very high concentration of salt: It would be obvious to one of ordinary skill in the art that water with higher salt content is more difficult to purify than water with lower salt content. Therefore, if one can make fresh water from water having 3.5% salt, one could very well make fresh water from water having 3g/L of salt (or 0.3%), with the same process, and this argument lacks merit.

With re to the 65% yield of divalent cations, this is already discussed in the rejection. Irrespective of the applicants' use of the term "yield", what one is doing in this process is *removing* salt from water containing salt, and the removed salt is accounted for, and therefore, "yielded", even if it is subsequently thrown away.

Conclusion

This is a first action in response to an RCE. Since there is new grounds for rejection, it is made non-final.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Krishnan Menon
Patent Examiner


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